The interaction effects of online reviews, brand and price on consumer hotel booking decision making

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Abstract

When searching and booking a hotel online, consumers are exposed to multiple cues such as customer reviews, price, and brand names. This study aims to examine the level of diagnosticity and simultaneous effects of the three important decision cues: online review, price, and brand on consumer quality evaluation and hotel booking intention. Study 1 is a randomized controlled experiment of 2 (high versus low price) × 2 (positive versus negative online review) × 2 (familiar versus unknown brand). Study 2 replicates and extends Study 1 by further examining the three cues' effects on both perceived quality and booking intention, and the mediation effect of perceived quality. The results reveal three-way interaction effects of multiple cues in consumers' decision processes and indicate that negative reviews have a dominating effect on hotel booking intention, and the level of cue diagnosticity from high to low is: online review, brand familiarity, and price.

Keywords: Cue diagnosticity; Negativity bias; Price; Online review; Brand familiarity.

Introduction

Online travel booking platforms have been one of the most important tourism marketing channels, thanks to the development of information technology (Ert and Fleischer 2016). It is predicted that the total number of online bookings for global destinations will increase from $12 billion in 2015 to $27 billion in 2020, of which the hotel online booking business is believed to have an opportunity to exceed by 50% of the total tourism bookings (Blutstein et al. 2017). When booking a hotel online, consumers often feel uncertain about the quality of the hotels on offer (Agag and El-Masry 2016, Shin et al. 2018). They look for product-related cues such as brand, price, and online reviews before making a booking decision (Bigné, William, and Soria-Olivas 2019, Ert and Fleischer 2016, Kim et al. 2019). These cues can be either intrinsic or extrinsic. Intrinsic cues refer to the inherent attributes of a product, such as product size, shape, texture, taste, and other characteristics, while extrinsic cues refer to a series of independent and flexible attributes, such as price, brand, and source area (Richardson, Dick, and Jain 1994, Szybillo and Jacoby 1974). For experience products such as hotel and tourism services, the intrinsic cues are generally not available at the time of purchase, and it is usually not cost-effective to search for such cues (Miyazaki, Grewal, and Goodstein 2005). Therefore, as can be expected, consumers rely on extrinsic cues for making travel decisions (Purnawirawan et al. 2015).

Brand, price, and online reviews are among the major extrinsic cues that consumers search for when purchasing experience products (Akdeniz, Calantone, and Voorhees 2013, Lien et al. 2015). A brand is a key extrinsic cue for evaluating product quality because brand familiarity brings certainty and confidence in consumer decisions (Sun 2014, Teas and Agarwal 2000). Price is usually considered as an incentive that motivates consumers to book a hotel online, as consumers can easily compare prices across different vendors in the digital environment (Kim et al. 2019). Moreover, price may signal information about the quality and value of the product.

If a consumer believes the price is reasonable, they are more likely to purchase the product (Lien et al. 2015). Online reviews provide vicarious experiences for the consumers to reduce uncertainty and avoid purchase risks, and today's consumers prefer to browse online reviews about several alternative hotels in the social media before narrowing down on a choice (Murphy and Chen 2014, Park and Nicolau 2015, Phillips et al. 2016, Zhang, Wu, and Mattila 2016)

The three important extrinsic cues in online hotel booking, i.e., brand familiarity, price, and online review have been systematically discussed as antecedents of online travel bookings (Lien et al. 2015). Studies in this area mainly examine the relationships between these cues and booking intentions (Casaló et al. 2015b). There are also studies examining the effects of perceived website security, recommendation, satisfaction, trust, and other emotional attitudes on hotel booking intentions (Bonsón Ponte, Carvajal-Trujillo, and Escobar-Rodríguez 2015, Sparks and Browning 2011). However, previous studies rarely examine the simultaneous interaction effects of the multiple cues of brand familiarity, price, and online review from a cue-diagnosticity perspective. Understanding how these major cues simultaneously affect booking intention is essential because consumers rarely process a single cue in isolation (Dawar and Parker 1994, Miyazaki, Grewal, and Goodstein 2005).

This study aims to advance our knowledge of how consumers process the three extrinsic cues for booking a hotel online: price, online review, and brand familiarity. Drawing upon cue-diagnosticity, negativity bias, and cue-consistency theories, this study specifically addresses the following research questions: What are the relationships that exist among the multiple cues of price, online reviews, and brand familiarity in affecting hotel consumers' online booking intentions? Which one of the cues plays a dominating role, and which ones play supporting roles?

This study makes three major contributions to the travel and tourism literature. First, it identifies the level of the diagnosticity of three major online hotel booking cues, i.e., online

review, price, and brand, by classifying them into high- versus low-scope cues. Second, it reveals their simultaneous interaction effects on booking intentions. Third, it further uncovers the three-way interactions among online review, price and brand cues, showing the intricacy of the multiple cues on consumer booking intentions.

Conceptual background and hypotheses

Conceptual background

Consumers rely on product cues to form a judgment and make a purchase decision (Olson and Jacoby 1972). In an online environment, customer reviews represent an extrinsic cue that consumers may use in conjunction with cues such as price, brand name, and description of the service facility and associated visual information (Choi, Hickerson, and Kerstetter 2018). Examining how tourists evaluate the cues of a destination, Choi, Hickerson, and Kerstetter (2018) show how the visual cues from various sources influence tourist perceptions, destination images, and subsequent intention to visit. Faced with numerous cues, a consumer usually processes only a few key diagnostic cues rather than each of them to reach a decision (Häubl and Trifts 2000, Shah and Oppenheimer 2008, Tanford and Kim 2019).

The diagnosticity of a cue refers to its accuracy and reliability in differentiating the product from its alternatives (Akdeniz, Calantone, and Voorhees 2013). In other words, a high diagnostic cue is more helpful for the consumer to discern the quality of a product and make a decision than a low diagnostic cue (Purohit and Srivastava 2001). Baek, Ahn, and Choi (2012) suggest that central cues such as the length of a review and presence of negative reviews are helpful when evaluating product alternatives, whereas peripheral cues such as review ratings or rankings are useful when consumers search for information. Mudambi and Schuff (2010) highlight that the depth of a review is helpful. Liu and Park (2015) found that the qualitative aspects of online travel reviews are most useful.

Cues can be categorized as high-scope or low-scope depending on their diagnosticity. High-scope cues are stable and cannot be easily affected by other factors, most of which can have direct effects on consumers; in contrast, low-scope cues are unstable and can be easily affected by others, and their diagnosticity depends on the high-scope cues (Akdeniz, Calantone,

and Voorhees 2013). Low-scope cues can significantly affect consumers' decisions only when at least one of the high-scope cues is positive. If all the high-scope cues are negative, low-scope cues can have little effect (Olson and Jacoby 1972). This is because negative cues are generally more salient and useful for making a judgment than positive ones (Ito et al. 1998, Wu 2013). When two cues are consistent, both can be salient and receive similar attention, their effect is stronger than that of a pair of inconsistent cues (Miyazaki, Grewal, and Goodstein 2005). When two cues are inconsistent, the negative one becomes more salient and, hence, more diagnostic (Baek, Ahn, and Choi 2012, Casaló et al. 2015a)

Hypotheses

Online reviews provide large amounts of diagnostic information, which can also be viewed as an extrinsic cue that is closest to the intrinsic cue. The valence of an online review represents a type of positive or negative attitude towards a certain product. The quantity and valence of online reviews have an interactive effect: an increase in the online review quantity gradually increases the promotion effect of review valence on the hotel booking intention (Tsao et al. 2015). It has been reported that consumer attitude enters a positive level when the quantity ratio of positive and negative reviews approaches the threshold of 3.1:1 or higher (East, Hammond, and Lomax 2008). Therefore, we can expect that online reviews are highly diagnostic, in other words, they are a high-scope cue.

Price is the amount of money that consumers need to pay for acquiring a product. It represents a monetary sacrifice or cost. Higher price indicates a higher level of sacrifice, which may lead to a reduced willingness to pay (Dodds, Monroe, and Grewal 1991). However, as a prominent extrinsic cue, price is often used by the consumer to infer the quality of the product: a high price signals high quality (Brucks, Zeithaml, and Naylor 2000). This results in a paradoxical situation in which a consumer has to make a trade-off between monetary sacrifice and desired quality. Therefore, price is not a particularly helpful decision cue; i.e., its

diagnosticity is low and dependent on other cues (Brucks, Zeithaml, and Naylor 2000). For example, for the same price different consumers may perceive it as cheap, moderate, or expensive, depending on their financial situation (being rich or poor, or the available budget), purchase situation (e.g., peak or off-peak seasons, or flexibility of travel dates) and the competitive offers (Dodds, Monroe, and Grewal 1991). Therefore, price can be seen as a low-scope cue (Akdeniz, Calantone, and Voorhees 2013). A study of online hotel bookings by Noone and McGuire (2014) shows that in the presence of online reviews, the influence of price on consumer pre-purchase perception of hotel quality is insignificant. Therefore, we expect that the diagnosticity of price cue is low when the online review cue is available; and the effect of price on purchase decisions depends on the high-scope cue, online reviews. We hypothesize that,

> **H1:** There will be an interaction of online review and price on hotel booking intention, such that for a hotel with positive online reviews, the price will be a significant predictor of booking intention; for a hotel with negative online reviews, the price will not have any significant effect on booking intentions.

A familiar brand helps consumers to reduce the perceived risk of the purchase, as the brand name is a signal of quality (Erdem, Keane, and Sun 2008), whereby,consumers are more likely to select a familiar rather than unfamiliar brand. A brand name is highly diagnostic when a consumer has limited previous product experience (Hoeffler and Keller 2003). Several studies have confirmed that a brand name or the reputation of a brand serves as a high-scope cue for quality judgment and purchase decisions (e.g., Akdeniz, Calantone, and Voorhees 2013, Dawar and Parker 1994). Purohit and Srivastava (2001), examining the effects of after-sales guarantee, brand image, and reputation on purchase intentions, found that brand image and reputation belong to the relatively stable cues: when the brand image is positive, consumers have a strong purchase intention despite having an unsatisfactory after-sale service.

Brand familiarity is developed either through product experience (Erdem, Swait, and Valenzuela 2006) or social and marketing communications (Keller 1993). Online reviews are an important social communication channel from which consumers obtain band-related information as online reviews represent the product experience of previous customers (Benedicktus et al. 2010). Therefore, when both cues of online reviews and brand names are available, online reviews could be more diagnostic. The study by Benedicktus et al. (2010) shows that online review influences purchase intentions regardless of brand familiarity. The results indicate that although brand familiarity is generally a high-scope cue, it becomes relatively low-scope when the online review cue is present. Therefore, we hypothesize that:

H2: There will be a significant interaction between the online review and brand familiarity on hotel booking intention, such that for a hotel with positive online reviews, brand familiarity will be a significant predictor of booking intention; for a hotel with negative online reviews, brand familiarity will not have any significant effect on booking intentions.

As noted earlier, price is a low-scope cue and, in comparison, brand familiarity is relatively high-scope (Akdeniz, Calantone, and Voorhees 2013, Dawar and Parker 1994, Purohit and Srivastava 2001). The branding literature has established that consumers are less price-sensitive when purchasing a familiar versus unknown brand (Erdem, Keane, and Sun 2008, Hoeffler and Keller 2003). Moreover, a brand name often serves as a cue for risk reduction (Dodds, Monroe, and Grewal 1991): For an unknown brand, the purchase is likely to be risky, and consumers tend to select the low price to avoid costs; meanwhile, for a well-known brand, the consumer is more confident with the purchase, hence, price is less likely to be used for risk reduction purposes. Therefore, we hypothesize:

H3: There will be a significant interaction between brand familiarity and price on hotel booking intention, such that the effect of price on booking intention is weaker for a familiar rather than unknown brand.

Cue-consistency theory argues that when several cues are consistent, they will have a stronger effect than when they are inconsistent (Miyazaki, Grewal, and Goodstein 2005). Where thrtr are inconsistent cues, negativity bias theory (Miyazaki, Grewal, and Goodstein 2005) suggests that consumers will pay more attention to the negative cues, thus enhancing the effect of the negative cue on the purchase decision (Purnawirawan et al. 2015). Following this, we argue that under the condition where the online review is positive and the brand name is familiar, the low price will be a positive cue of good value and, as a result, all three cues are consistently positive. In a case where the three cues show disparate information, consumers will be more inclined to use negative cues to reduce purchase risk. Furthermore, according to the cue diagnosticity theory, low-scope cues can play a role in influencing purchase decisions only if one of the high-scope cues is positive; and when the high-scope cues are negative, the low-scope cues may become insignificant (Akdeniz, Calantone, and Voorhees 2013, Purohit and Srivastava 2001). Given that online review is a high-scope cue, followed by brand familiarity, and price is the low-scope cue, we posit that:

> **H4:** There will be a significant three-way interaction among online review, brand familiarity, and price in predicting hotel booking intention, such that: under positive online review, the interaction effect of brand familiarity and price on booking intention will be significant; and, under negative online review, the interaction between brand familiarity and price in predicting booking intention will be insignificant.

Study 1

Participants

The study 1 experiment was conducted from June to December of 2016. Eight research assistants used the street-intercept method to recruit participants on a busy street at a university campus in a city in southern China, randomly assigning the eight different experimental

questionnaires to participants. The rationale of using the street-intercept survey, a quasi-experimental field experiment (Ladhari and Michaud 2015, Sparks and Browning 2011) is because the search for travel and hotel information by young consumers is usually conducted over a smartphone when they are performing other tasks such as walking, dining, studying, or working, rather than in a confined environment, i.e., in the laboratory. Convenience sampling was used to collect data. A sample of 232 participants (male: 110, female: 122) who had booked a hotel online in the last 12 months were invited to participate in the experiment. Each experiment group consists of 29 participants (Table 1). The age composition of the sample was: 23.3% of the participants were between 18-20 years' old; 53.0% were 21 to 24 years' old, 19.8% were 25 to 28 years' old, and 3.9% were above 28 years' old. Graduate students comprise a majority of the sample (47.4%), and undergraduate and doctoral students accounted for 34.1% and 18.5% respectively. Considering the online booking experience, 50.4% of the participants had 1-3 years' experience, 24.1% had 4-6 years' experience, and 11.3% had more than six years' experience. Participants who had less than one year's experience accounted for 14.2%.

Procedure

The randomized controlled experiment primed 2 (high price versus low price) × 2 (positive reviews versus negative reviews) × 2 (a well-known brand versus an unknown brand) with a between-group design. The independent variables were manipulated using eight different online booking scenarios. The research assistants supervised and guided participants through the completion of the experiment.

Pre-test

We conducted a pre-test to examine the effectiveness of the three independent variables' manipulation. Each experimental group was assigned six participants, and 48 participants were involved in the pretest. The value of Cronbach's alpha of the variables was between 0.907 and

0.928. Homogeneity of variance test results showed that the mean values of price in the two groups have significant differences ($t = 2.297$, $p < 0.05$). Online review (F (1, 46) = 4.233, $p < 0.05$) and brand familiarity (F (1, 46) = 10.134, $p < 0.05$) had significant differences in their groups' mean values. Thus, it can be confirmed that the three variables were effectively manipulated.

Variable measurement and manipulation

The measurement of price was based on the work of Dodds, Monroe, and Grewal (1991), consisting of five items on a five-point Likert scale (1=strongly disagree, 5=strongly agree): "The hotel is economical"; "The price is affordable"; "The price is acceptable"; "The price is low"; and "The hotel is well worth the price". Scenarios in the experiment were as follows: treatment groups were shown the original hotel room rate as CNY330 and the current price as CNY204 (38% off, CNY1 = USD 0.144), according to the idea that discount or comparison between current and original product promotes the perception of price reduction (Dodds, Monroe, and Grewal 1991, Erdem, Keane, and Sun 2008). Online review manipulation is a scenario description for the online hotel booking platform. Except for the online reviews, all other information is the same for all scenarios. According to Prabu (2014), the number of reviews that an average consumer would read ranges between six and 12, we decided to design 12 pieces of online reviews for each scenario, following a pre-test with 25 participants, which showed that the number of reviews being read was 11 to 14 pieces. We observed 562 pieces of real hotel reviews collected from the major Chinese online booking platforms (Ctrip, Qunar Tuniu, etc.), and found the major attributes of a hotel reviewed by consumers were: location, service quality, environment, room quality, and value for money. We then referred to the real hotel booking platform's reviews to imitate the reviewers' words, moods, attitudes, and description methods to design the content of the reviews used for the experiment (Ye, Law, and Gu 2009).

We set the ratio of review valence (good versus bad, or bad versus good) in the experimental groups at 9:3, following Sundar, Xu, and Oeldorf-Hirsch's (2009) study. The scenario in the high level was three fully positive reviews, one simple negative review, and eight simple positive reviews. The scenario in the low level was three fully negative reviews, one simple positive review, and eight simple negative reviews. Each review was presented randomly in different experiment scenes to avoid primacy and recency effects. Based on the actual situation of the hotel website evaluation system, the overall rating (five points) was also used. The groups of positive reviews scored an overall 4.3 points, while the groups of the negative reviews scored an overall 2.3 points (Table 2 and 3). This design was consistent with the previous studies; for example, Melián-González, Bulchand-Gidumal, and González López-Valcárcel (2013) suggest that a review rating between 4 and 5 (on a five-point scale) was considered satisfactory. Rhee and Yang (2015) set the "low vs. high" hotel ratings in online reviews to "2 vs. 4", and the overall ratings for the low group were set between 3.0 and 3.5, and for the high group between 4.0 and 4.5. Our own observation of customer review ratings (between 2 and 5) in the actual hotel booking platform further confirmed that our design successfully simulated the actual booking environment.

< Insert Table 1, 2 & 3 here >

Brand familiarity was measured based on three items on a five-point Likert scale (1=strongly disagree; 5=strongly agree), adopted from Rubinstein and Griffiths (2001): "I often see this hotel brand in advertisements"; "I often hear people talk about this hotel"; and "I often see this hotel brand". The manipulation is similar to that of Park and Stoel (2005), where stimulation in the high level showed an existing brand, and stimulation in the low level showed a fictitious brand. For the treatment groups in the experiment, the brand '7 Days Inn' (a well-known existing brand) was used. For control groups, a fictitious brand 'Linderman Inn' was

used. There were no descriptive differences between the two groups, except for the hotel brand names.

The measure of online booking intention was based on Zeithaml, Berry and Parasuraman's (1996) scale, which is widely used in service quality and behavioral studies. The measure consists of three items on a five-point Likert scale: (1=strongly disagree; 5=strongly agree): "I will consider booking the hotel"; "I think booking this hotel is not a bad idea"; and "It is very likely that I will book this hotel". Individual factors, including gender, age, education, and online reservation experience in the past and last year, were used as control variables.

Results

The results showed that the internal consistency of the variables is acceptable: Cronbach's α of price, online review, brand familiarity, and booking intention were 0.911, 0.903, 0.902, and 0.864, respectively. The effectiveness of the independent variables' manipulation was checked. The independent samples t-test results indicated that price ($M_{low\ level\ in\ price} = 2.911$, $M_{high\ level\ in\ price} = 2.577$, $t = 6.735$, $p < 0.05$), online review ($M_{positive\ level\ in\ online\ review} = 3.539$, $M_{negative\ level\ in\ online\ review} = 1.951$, $t = 16.956$, $p < 0.05$), and brand familiarity ($M_{high\ level\ in\ brand\ familiarity} = 3.017$, $M_{low\ level\ in\ brand\ familiarity} = 2.471$, $t = 4.190$, $p < 0.05$) had significant mean differences in the corresponding experimental groups. It can be confirmed that independent variables in the experiment were effectively manipulated (Figure 1).

< Insert Figure 1 here >

The diagnosticity of online review, brand familiarity, and price

We ran a multiple linear regression test of the explanatory power of the cues on booking intention to evaluate the diagnosticity of the three cues. The results, as shown in Table 4, indicated that the three predictor variables explained approximately 62% of the variance in booking intention. A multi-collinearity test showed that the variance inflation factor (VIF) of

the predictor variables was under the critical value 2.0, which suggests that collinearity is not an issue of concern. As expected, the results showed that the diagnosticity of the cues from strong to weak was that online review ($\beta = 0.722$, $p < 0.01$), brand familiarity ($\beta = 0.283$, $p < 0.01$), and price ($\beta = -0.183$, $p < 0.01$).

< Insert Table 4 here >

The main effect of single cues

The results of correlation analysis indicated that the independent variables were significantly related to the dependent variable (r (PP, BI) = -0.233, r (OR, BI) = 0.721, and r (BF, BI) = 0.299, $p < 0.05$), and mean values and standard deviation of all the variables were presented in Table 5. Multivariate analysis of variance in the general linear model (GLM) was used to explore cues' utilization for online hotel booking. The results are presented in Table 6. The main effect of price was significant (F (1 , 224) = 24.709, $p < 0.001$). The main effects of online review (F (1,224) = 384.401, $p < 0.001$) and brand familiarity (F (1,224) = 59.095, $p < 0.001$) were also significant.

< Insert Table 5 here >

< Insert Table 6 here >

The interaction of price and online review

The first hypothesis of this study (H1) states that there will be an interaction of online review and price on hotel booking intention, specifically when online reviews are positive, price will be a significant predictor of booking intention; when online reviews are negative, price will not have any significant effect on booking intentions. The analysis revealed the interaction effect of price and online review on hotel booking (F (1, 224) = 21.181, $p < 0.05$). Specifically, a simple slope analysis (shown in Figure 2a.) suggested that: when online review was on a positive level, price had a significant effect on consumer booking intention ($\beta = -0.177$, $p <$

0.05); when the online review was negative, price did not have any significant effect on booking intentions (β = -0.007, p > 0.05). Thus, H1 was supported. The results show that a low scope cue such as price was a significant predictor only when paired with a consistent high scope cue such as positive online reviews: low price indicates good value, hence strong purchase intention. But, under the condition of negative online reviews, the effect of the inconsistent cue of low price (good value) on booking intention becomes insignificant. In other words, the high scope cue of online reviews significantly moderates the effect of price on purchase intention.

< Insert Figure 2 here >

The interaction of online review and brand familiarity

The second hypothesis of this study (H2) states that there will be a significant interaction between online review and brand familiarity on hotel booking intention, specifically, when online reviews are positive, brand familiarity will be a significant predictor of booking intention; and when online reviews are negative, brand familiarity will not have any significant effect on booking intentions. The data analysis showed that the interaction of online reviews and brand familiarity had a significant effect on hotel booking intention (F (1, 224) = 6.082, p < 0.05). As shown in Figure 2b, when the online review was positive, brand familiarity had a significant effect on booking intentions (β = 0.196, p < 0.05). In contrast, when the online review was negative, brand familiarity did not have any significant effect on booking intentions (β = 0.083, p > 0.05). Thus, H2 was supported. The results show that brand familiarity can influence booking intention only when paired with positive online reviews. The effect of brand familiarity is similar to that of price, both are relatively low scope cues in comparison with online review.

The interaction of price and brand familiarity

The third hypothesis of this study (H3) proposes that there will be a significant interaction between brand familiarity and price on hotel booking intention, specifically, the effect of price on booking intention is weaker for a familiar rather than unknown brand. The results indicate that the interaction of price and brand familiarity was significant (F = 6.071, $p < 0.05$). As shown in Figure 2c, when brand familiarity was low, the price had a significant effect on booking intentions (β_1 = -0.093, $p < 0.05$); and when brand familiarity was high, price continued to have a significant effect (β_2 = -0.138, $p < 0.05$). Further examination shows that in the high brand familiarity level groups, price had a significantly weaker explanation power on booking intention than in the low brand familiarity groups (ΔF = 32.907, $p < 0.05$). Thus H3 was supported. This result suggests that the diagnosticity of price varies depending upon brand familiarity, indicating the relatively low scope cue of price.

The three-way interaction of brand familiarity, price, and online review

Hypothesis 4 was about the three-way interaction among online reviews, brand familiarity, and price in predicting hotel booking intention. This hypothesis was supported. The results showed that the three-way interaction term was significant (F (1, 224) = 11.707, $p < 0.05$), and the effects that brand familiarity and price had on booking intentions depended on the valence of online review (Figure 3a-b). Specifically, under positive online review, the interaction effect of brand familiarity and price on booking intention was significant ($\beta_{\text{PP*BF at positive OR level}}$ = -0.315, $p < 0.05$). The results further showed that price for a familiar brand (β = -0.148, $p < 0.05$) had a weaker effect on booking intention than that for an unknown brand (β = -0.457, $p < 0.05$). The results indicate that the moderation effect of brand familiarity on the relationship between price and booking intention is dependent on the valence of online reviews. By comparing Figure 3a and Figure 3b, we can see that under negative online reviews, regardless of the level of brand familiarity, the effect of price on customer willingness is not significant ($p > 0.05$). Figure 3c shows that when online reviews are positive, brand familiarity and price interact to

influence purchase intentions. These results are consistent with those of the two-way interaction analysis presented in the previous section, further confirming that online review is the highest-scope cue, brand familiarity is the second-highest scope cue, and price is the lowest-scope cue.

< Insert Figure 3 here >

Study 2

The results of Experiment 1 supported all the hypotheses; however, the generalizability might be limited due to the sample consisting of a high proportion of students and the use of budget hotels as the study stimulus. In Experiment 2, we simulated a real online booking interface, recruited real consumers, and used full-service hotels as the study stimulus. We further tested the mediating role of perceived quality between the three-way interaction of the cues and booking intention. The rationale for the inclusion of quality perception was that consumers use multiple cues to evaluate product quality and, subsequently, make a booking decision (Akdeniz, Calantone, and Voorhees 2013).

Participants and procedure

The experiment used the same design as in Study 1, i.e., a 2 (high price vs. low price) x 2 (high brand familiarity vs. low brand familiarity) x 2 (positive comments vs. negative comments) between-subjects design. The manipulation for the price was that the high price was set at CNY 399, and the low price CNY 199 (50% off, CNY 1 = USD 0.14). For high brand familiarity, we used the name "Si Ji", a hotel brand that enjoyed high recognition among travelers in China, and for low brand familiarity we used a fictitious hotel brand name "Mei Ji". The measures for the key variables were the same as those in Study 1, with the addition of the measures of perceived quality (Purohit and Srivastava 2001): "This hotel is likely to be of high quality"; "This hotel is likely to be reliable"; "I would not worry about the quality of this hotel"; "Compared to the other hotels, the quality of this hotel is much better"; and " My overall impression is that it is a good quality hotel". All measurement items were anchored a five-point Likert scale (1=strong disagree; 5=strongly agree).

A screening question was used to filter outthe student sample, and to confirm that all participants had online hotel booking experience for three or more trips in the past 12 months.

With the aid of a market research company, participants were recruited from an online consumer panel of frequent travelers in China. Participants received a small incentive in loyalty points from the company. The study was conducted from July to August 2019. We received 413 responses, after excluding invalid responses, 366 of which were used for data analysis. Each of the experiment groups had 40 or more participants. Among these participants, there were 185 males and 181 females, with an average age of 30.66 years' old. In terms of academic qualifications, junior college and below accounted for 28.1%, undergraduates accounted for 36.1%, and graduate degree and above accounted for 35.8%. The sample tended to be young and well-educated, which reflects the profile of the majority of Chinese travelers who use online booking facilities.

Manipulation checks

ANOVA showed that the price ($M_{\text{low price}} = 3.594$, $M_{\text{high price}} = 2.774$, $p < 0.001$), brand familiarity ($M_{\text{low brand familiarity}} = 2.381$, $M_{\text{high brand familiarity}} = 3.626$, $p < 0.001$) and online review ($M_{\text{negative online review}} = 2.160$, $M_{\text{positive online review}} = 3.899$, $p < 0.01$) were significantly different at different levels of control, indicating that the experimental material was valid and the variable manipulation was successful. Through the reliability and validity test of the variables, the results indicated price ($\alpha = 0.891$, $CR = 0.891$, $AVE = 0.620$), brand familiarity ($\alpha = 0.854$, $CR = 0.856$, $AVE = 0.666$), online review ($\alpha = 0.869$, $CR = 0.870$, $AVE = 0.691$), perceived quality ($\alpha = 0.912$, $CR = 0.912$, $AVE = 0.674$) and booking intention ($\alpha = 0.892$, $CR = 0.892$, $AVE = 0.733$) with good reliability and convergent validity. The various fit indices of the measurement model exceeded the required thresholds ($\chi^2/df = 1.499$, $CFI = 0.983$, $TLI = 0.980$, $RMSEA = 0.037$, $SRMR = 0.032$).

Results

Table 7 shows the results of the regression analysis with demographics as control variables. The level of diagnosticity of the three cues was evaluated by examining the magnitude of the coefficients in Models 1 and 3, which showed that the diagnosticity of the cues from high to low was online review, brand familiarity, and price.

< Insert Table 7 here >

As shown in Table 7, the direct effects of brand familiarity and online review on perceived quality (β_{BF} = 0. 213, $p < 0.001$; β_{OR} = 0. 616, $p < 0.001$, Model 1) and booking intention (β_{BF} = 0.163, $p < 0.001$; β_{OR} = 0.506, $p < 0.001$, Model 3) were significant. But the direct effects of price and perceived quality (β_{PP} = 0.076, $p > 0.05$, Model 1) and purchase intention (β_{PP} = 0. 071, $p > 0.05$, Model 3) did not reach a significant level. This result was different from Experiment 1, which showed that the effect of price on purchase intention was significant.

The effects of the two-way interaction term (β_{PP*BF} = 0.104, $p < 0.05$; β_{PP*OR} = 0.094, $p < 0.05$; β_{OR*BF} = 0.152, $p < 0.01$) and the three-way interaction term ($\beta_{PP*BF*OR}$ = 0.081, $p <0.05$) on perceived quality were significant (Model 2). Similarly, the two-way interaction effects (β_{PP*BF} = 0.134, $p < 0.01$; β_{PP*OR} = 0.112, $p < 0.05$; β_{OR*BF} = 0.111, $p < 0.05$) and the three-way interaction effect ($\beta_{PP*BF*OR}$ = 0.106, $p < 0.01$) on booking intention were also significant.

The results (Figures 4a and 4b) indicated that when online reviews were positive, the interaction effects of price and brand interactions on perceived quality ($\beta_{PP*BF \text{ at positive OR level}}$ = 0.121, $p < 0.05$) and booking intention ($\beta_{PP*BF \text{ at positive OR level}} = 0.157, p < 0.05$) were significant; when the online reviews were negative, the interaction of price and brand were not significant on either perceived quality ($\beta_{PP*BF \text{ at negative OR level}}$ = 0.041, $p > 0.05$) or booking intention ($\beta_{PP*BF \text{ at negative OR level}}$ = 0. 073, $p > 0.05$). The results confirmed the findings in Study 1.

Figure 4b depicts the simple effects within the three-way interactions. A comparison of Lines (1) and (2) shows that brand familiarity can significantly affect booking intention, although its effect can only exist in the case of positive reviews. A comparison of Lines (2), (3), and (4) show that brand familiarity significantly influenced booking intention, while the effect of price was insignificant, confirming that online review is a higher-scope cue than either brand familiarity or price, and brand is a higher-scope cue than price.

< Insert Figure 4 here >

SPSS-PROCESS was adopted to test the mediation effect of perceived quality between three-way interaction term (price x brand familiarity x online review) and booking intention by selecting the fixed model of 12 and setting the number of Bootstraps to 2000. The results show that the mediation effect was significant (β = 0.0310, *SE* = 0.0185, *BootLLCI* = 0.0005, *BootULCI* = 0.0711), confirming that the interaction effect of the three cues on booking intention was mediated through perceived quality.

Discussion and conclusions

The main objective of this study was to examine the interaction effect of three key extrinsic online hotel booking cues, i.e., online review, brand familiarity, and price on online hotel booking intention. Study 1 shows that: a) the level of cue diagnosticity from high to low is: online review, brand familiarity, and price; b) there were significant two-way interaction effects, for example when online reviews are positive, price and brand cues have significant effects on booking intentions; however, when online reviews are negative, the other two cues do not have any significant effect on booking intentions; and c) there was also significant three-way interaction. Study 2 replicates and extends the first study by further examining the effect of the three multiple cues on both perceived quality and booking intention, and the mediating effect of perceived quality.

The findings from the test of two-way interactions confirm that the effect of a low-scope cue (brand familiarity or price) is dependent on a high-scope cue (online review) (Purohit and Srivastava 2001). Three groups of interaction effects were revealed. First, online review moderates the effect of brand familiarity on booking intention. Specifically, when online reviews are positive, consumers tend to book the hotel of a familiar rather than unfamiliar brand; in contrast, when reviews are negative, consumers have little intention to book the hotel regardless of whether the brand is familiar. Second, when online reviews of a hotel are positive, lower price leads to higher booking intention; in contrast, when reviews are negative, consumers have little intention to book the hotel regardless of price. The result confirms our argument that price is a low-scope cue, and has limited diagnostic power and does not play an essential role in decision making in the online shopping environment (Erdem, Keane, and Sun 2008). Third, the study results further indicate that brand familiarity significantly moderates the effect of price on hotel booking intention, such that under a familiar brand, consumers are

less price-sensitive, whereas, for an unfamiliar brand, consumers are more price sensitive. Hence, brand familiarity is a higher scope cue than price.

Overall the study results reveal a three-way interaction among online review, brand familiarity, and price on hotel booking intention. The effects that brand familiarity and price had on booking intentions depend on the valence of online reviews. Specifically, under positive online review, the interaction effect of brand familiarity and price on booking intention would be significant, and under negative online review, the interaction between brand familiarity and price in predicting booking intention would be insignificant.

Theoretical implications

Interactions among multiple decision cues concerning online hotel booking have rarely been examined in previous travel and tourism studies; as such, our study offers a fresh, unique, and integrative approach to advancing our understanding of online hotel booking decision processes. By simultaneously investigating the effects of online review, brand familiarity, and price, our research provides novel insights into the differential effects of the cues. Particularly, the study reveals that brand familiarity is a relatively low-scope cue to online review. Previous studies reveal that brand familiarity exists as a high-scope cue that brings positive brand associations and attitudes (Dawar and Parker 1994) and, consequently, influences purchase decisions. Surprisingly, our findings indicate that the diagnosticity of brand familiarity is weak in comparison with online review. It does not have any significant effects on booking intentions when online reviews are negative. The possible reason is that previous studies have mostly focused on brand reputation or brand equity rather than familiar versus unknown brands; the products examined in those studies were not experience-based, and the purchase channels were not the internet (e.g., Akdeniz, Calantone, and Voorhees 2013, Dodds, Monroe, and Grewal 1991). The current study shows that in an online environment, although brand familiarity is an

essential factor for brand selection, consumers prefer to judge a hotel based on the experiences of previous customers of the product as reflected in online reviews (Ladhari and Michaud 2015).

Our study provides empirical evidence to support our hypotheses regarding the effect of congruency between high- and low-scope cues, as well as the dominant effect of high-scope over low-scope cues on booking intentions. The results suggest that low scope cues, such as low price and brand familiarity, are significant predictors only when paired with a congruent high scope cue, such as positive online reviews. Particularly, when facing uncertain situations, the congruency of cues provided by positive online reviews and low-price significantly increases booking intention. Study 2 further shows that under the condition of positive congruent cues, signaled by positive online reviews, high brand familiarity, and high price, consumers will perceive the hotel as high-quality, which leads to a higher booking intention. As suggested by Miyazaki, Grewal, and Goodstein (2005), consumers often use extrinsic cues to reduce risks when making a purchase decision. This is particularly true for the purchase of intangible, experience-based products such as hotel accommodation. When positive extrinsic cues are congruent and positive, booking intention increases. Our study thus sheds light on the role of the congruency of multiple extrinsic cues on consumer decision making.

Study 2 shows that the effects of price on perceived quality and purchase intention are not significant, which is different from the findings shown in Experiment 1. One possible explanation is because of the different hotel categories and samples used in study 2. In Study 1, the stimulus is budget hotels, and the sample is mainly students who were likely to be more sensitive to the price of this type of product than the sample in Study 2 who were mainly business travelers.

We can conclude that online review is highly diagnostic and can be regarded as a high-scope cue, which has determining effects on consumers' booking decisions; brand familiarity can be considered as a relatively low-scope cue to an online review, and the price is a low-

scope cue. Brand familiarity and price continue to significantly affect the booking decision only when a hotel's online reviews are positive. The study confirms that the impact of low-scope cues is dependent upon that of a higher scope cue. The results further confirm that when high-scope cues are positive, low-scope cues continue to have a significant effect; but when high-scope cues are negative, the effects of lower scope cues decrease or become insignificant.

Managerial implications

The findings of this study have several managerial implications. First, this study shows that online reviews, especially the negative ones, are the most important factor that affects consumers' hotel booking decisions. Hotel managers should treat online reviews as their top priority for their marketing strategy. It is imperative to do so in today's digital age as a result of the proliferation of online review websites and social media. They should allocate resources to develop specific mechanisms to encourage consumers to share their positive personal experiences on social media and travel review websites. They should also deploy specialized employees to interact and engage with consumers on those platforms. In addition to delivering excellent customer experience that encourages positive online reviews, they should have a set of recovery strategies in response to service failure, customer complaints, and negative online reviews.

Second, the findings of this study indicate that brand familiarity as a decision cue is more diagnostic than price, although less so than an online review. Hotels should continue to build and improve brand awareness to extend their popularity and influence, making brand familiarity a higher-scope cue that helps customers to make a booking decision.

Third, the study shows that price is a low-scope cue. Improving the salience of a low-scope cue such as price has a limited effect on consumer purchase intention if the hotel receives too many negative online reviews. Therefore, counter to intuition, hotel managers should be very

cautious about using price discount, as it works only if the hotel has good customer reviews. When initiating sales promotions, managers should deliver a clear message that low price is associated with great value rather than poor quality. More importantly, they should recognize that a non-price competition strategy could be more effective, such as social media and brand engagement. Instead of reducing prices, they should try to reduce consumer-perceived risk by providing additional information cues such as what experience customers can expect, the photos or videos of the hotel, and its environment.

Limitation and future research

This study is limited to the examination of the three cues of online review, brand familiarity, and price. In real-life situations, other variables could also influence booking intentions such as website security, booking platforms (hotel official website or a third party), and room types, which were not included in the study. Further studies are needed to explore the effects of these cues on consumer online travel booking. This study shows the different effects of price cue on quality evaluation and purchase intention between the two study samples, whereas factors such as individual background, personal characteristics, travel purpose, and purchase situations were not in the conceptual model. This could be an interesting direction for future researchers to explore. Finally, thanks to the advancement of big data analytics, future studies could use data from multi-sources to analyze how different online booking cues influence travel booking behavior and to predict sales performance using machine learning and artificial intelligence.

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Table 1. Experimental groups setting

Experiment Scenario	Brand Familiarity	
	Familiar	Unknown
	Online Review	

		Positive	Negative	High	Low
Price	High	Group 1	Group 2	Group 3	Group 4
	Low	Group 5	Group 6	Group 7	Group 8

(N= 232, 29 samples per group)

Table 2. Online reviews with a positive score level

Order	Online Review Content Overall Score 4.3
1	The hotel is conveniently located and well-served.
2	Very quiet. Free milk is provided.
3	Considering its location close to our work site, at first, my expectation was not very high. I telephoned the front desk to ask how I could reach there. The employees were kind enough to to give me directions to the hotel. The front desk employees were enthusiastic to say hello to me as the elevator door opened. VIP check-in service is more convenient. Although the room was small in size, the overall environment was clean. When I returned at night, the employees at the front desk asked me whether I required free milk. Very satisfied with the service. I will select the same hotel next time. Thanks to their excellent service.
4	A new decoration, a quiet environment.
5	The hotel service is good and clean.
6	Very good. Clean room settings are perfect, and the bed is big and comfortable. It may have been redecorated recently. The hotel is located close to the conference and exhibition center, thus I was not required to get up too early toget to the conference. Staff members are friendly and nice.
7	A good cost-performance ratio.
8	Excellent environment.
9	The hotel is close to the subway station, with convenient traffic around the shopping area. The hotel has a small facade and the front desk could be found through the long aisle. Check-in and check-out are very quick. My room had good lighting. Look out of the French window, you can obviously find a corridor, although I am not certain where the corridor ends. I was most impressed with the huge framed painting hanging on the wall in the room, which depicts a beautiful woman. The French window is so huge that people can jump from it.
10	Last time I came to Shanghai, I stayed here.
11	Hotel environment is average, and the front desk service is not bad.
12	Check in service is very slow. We were accommodated on a disappointing floor.

Table 3. Online reviews with a negative score level

Order	Online Review Content Overall Score 2.3
1	Location is neither good nor bad.
2	The door and window are poorly qualified. Constant noise, shampoo is too little, WiFiifi signal in the room is not good. Old decoration. The supply of hot water is insufficient. In a sentence, I am not satisfied with the hotel.
3	It is very noisy at midnight due to the KTV, and facilities are obsolete and not clean. I would not visit the hotel again.
4	Cost versus performance is average
5	The hotel front desk attendants are friendly. It was not a bad experience.
6	Apart from being located near the convention center, there is nothing worth recommending. The hot water tap is broken and the room is too damp to breathe. Too bad to say anything.
7	It has not been redecorated for a long time. Facilities are obsolete.
8	There was no window in my room and the floor position was awful.
9	The hotel room was damp.
10	Poor soundproof.
11	The manager was not very friendly.
12	The hotel environment is ok and the service is just average.

Table 4. Outputs of multiple linear regression analysis

Model	Standard Coefficients	t	Sig.	Regression Model Analysis			
				Adjusted R^2	D-Watson	t	Sig.
(Constant)		.488	.655				
Product price	-.183	-4.576	.000	0.615	1.409	123.976	0.000
Brand familiarity	.283	18.049	.000				
Online review	.722	70.770	.000				

Notes: dependent variable=booking intent.

Table 5. Mean values and SD of booking intention (BI)

Three Cues at Different Level		Familiar Brand				Unknown Brand			
		Online Review							
		Positive		Negative		Positive		Negative	
		M	SD	M	SD	M	SD	M	SD
Price	High	3.725	0.46	2.302	0.76	1.926	0.97	1.537	0.55
		Group 1		Group 2		Group 3		Group 4	
	Low	4.407	0.33	2.116	0.51	3.787	0.62	1.414	0.79
		Group 5		Group 6		Group 7		Group 8	

Table 6. AVOVA results in GLM analysis of booking intention

Sources	df	Sum of Square	F Value	Partial η^2
Product Price (PP)	1	8.748	24.709***	0.034
Online Review (OR)	1	136.094	384.401***	0.521
Brand Familiarity (BF)	1	20.922	59.095***	0.080
PP*OR	1	7.499	21.181***	0.029
PP*BF	1	2.153	6.082*	0.008
OR*BF	1	2.149	6.071*	0.008
PP*OR*BF	1	4.145	11.707**	0.016
Overall Model	7	181.710	25.959***	0.696
Residual	224	79.305		
Total	232	1973.257		
Corrected Total	231	261.015		
Adjusted R^2	0.696			

(***p < 0.001, **p < 0.001, *p < 0.05)

Table 7. Outputs of hierarchical regression analysis

Predictive variables	Perceived quality			Booking intentions	
	Model 0	Model 1	Model 2	Model 3	Model 4
Constant	3.180***	3.214***	3.141***	3.604***	3.628***
Control variables					
Gender	-0.112	-0.130	-0.124	-0.048	-0.057
Age	0.004	-0.001	-0.001	-0.002	-0.002
Education	-0.014	0.013	0.016	-0.049	-0.049
Experience	-0.037	0.005	0.006	-0.034	-0.039
Independent variable					
PP		0.076	0.081	0.071	0.077
BF		0.213***	0.209***	0.163***	0.150***
OR		0.616***	0.613***	0.506***	0.502***
Interaction					
PP*BF			0.104*		0.134**
PP*OR			0.094*		0.112*
BF*OR			0.152**		0.111*
PP*OR*OR			0.081*		0.106**
R^2	0.005	0.408***	0.450***	0.311***	0.368***
Adjusted R^2	-.006	0.397***	0.433***	0.298***	0.349***
ΔR^2	-	0.404***	0.042***	-	0.057***
F	0.421	81.363***	6.818***	23.120***	7.960***

(PP: Product price; BF: Brand familiarity; OR: Online review. ***p<0.001, **p<0.01, *p<0.05)

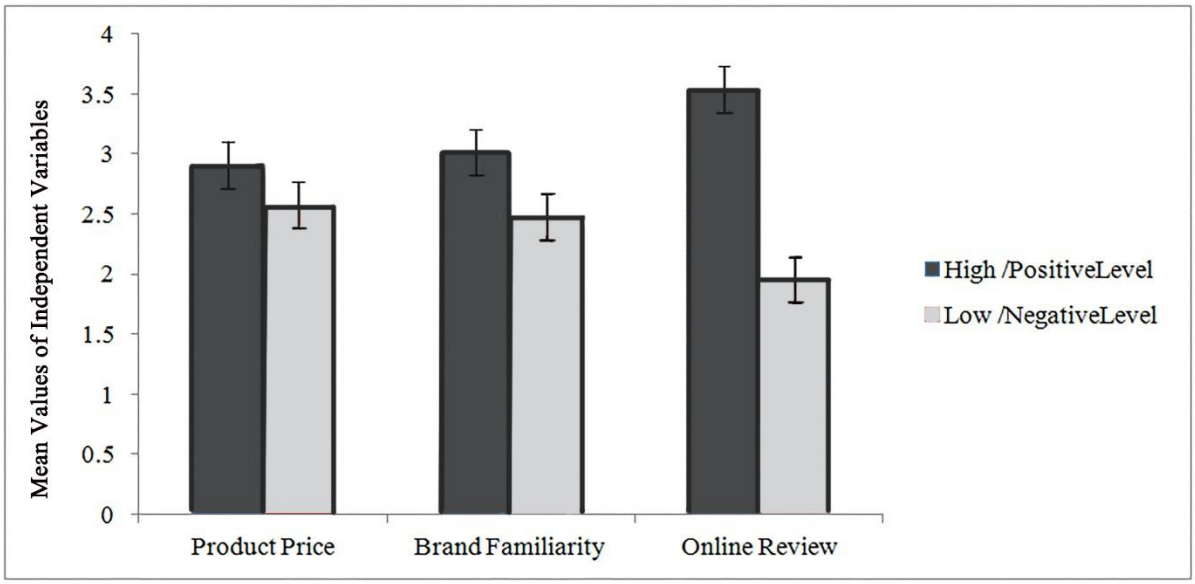

Figure 1. Mean values of independent variables at different levels

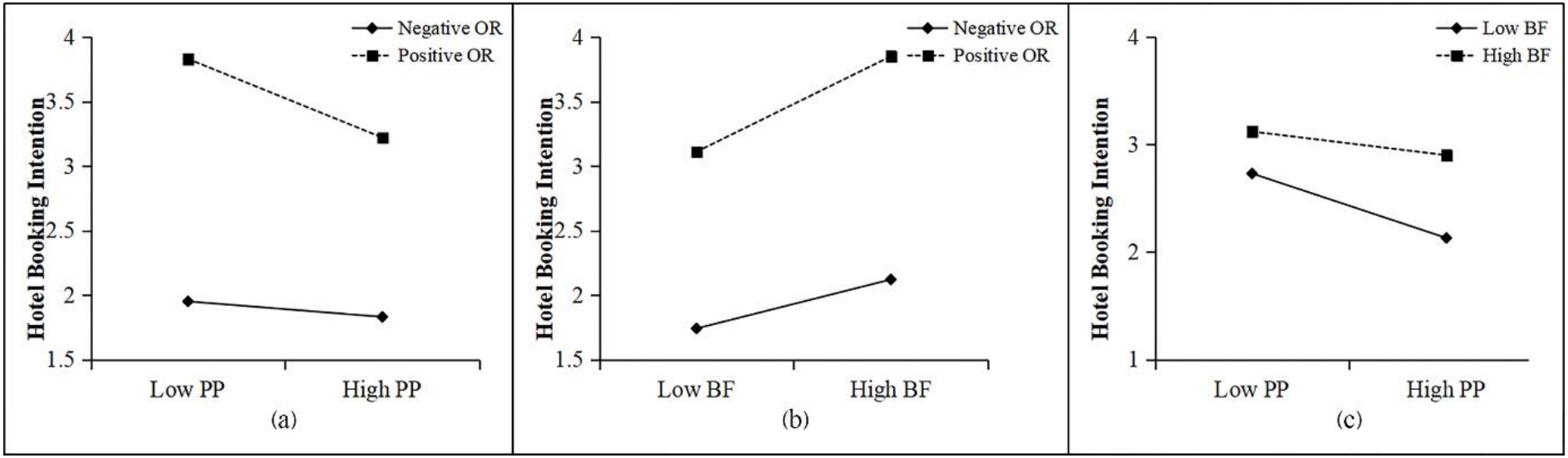

Figure 2. Simple effect analysis of the two-way interactions

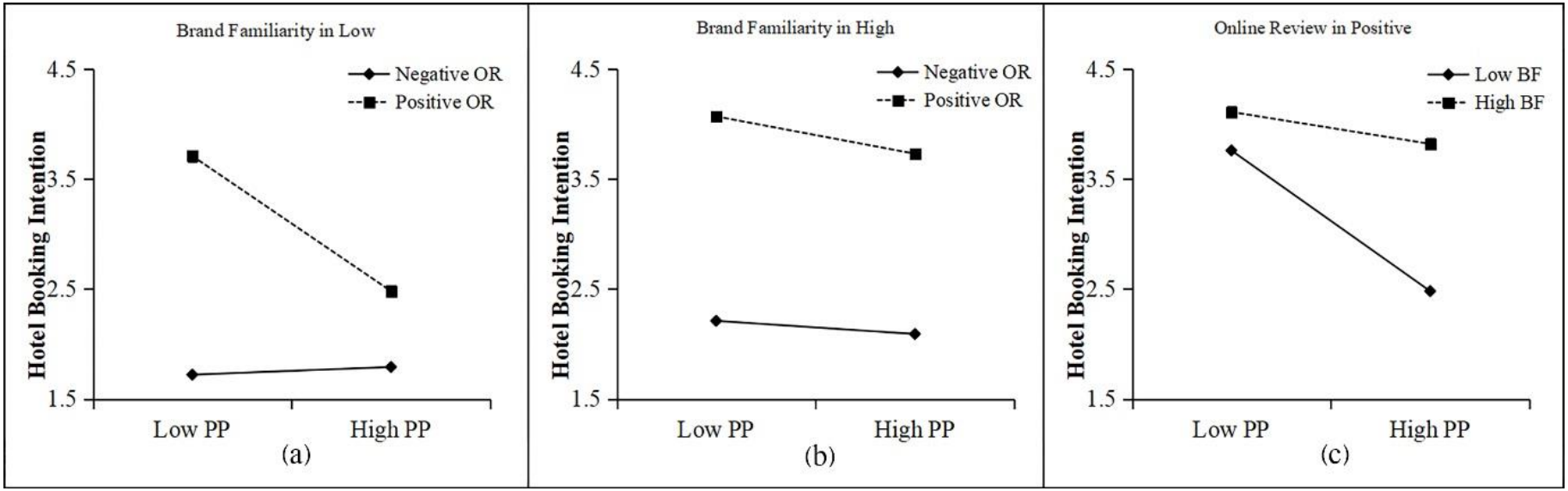

Figure 3. Simple effect analysis of the three-way interactions on booking intention

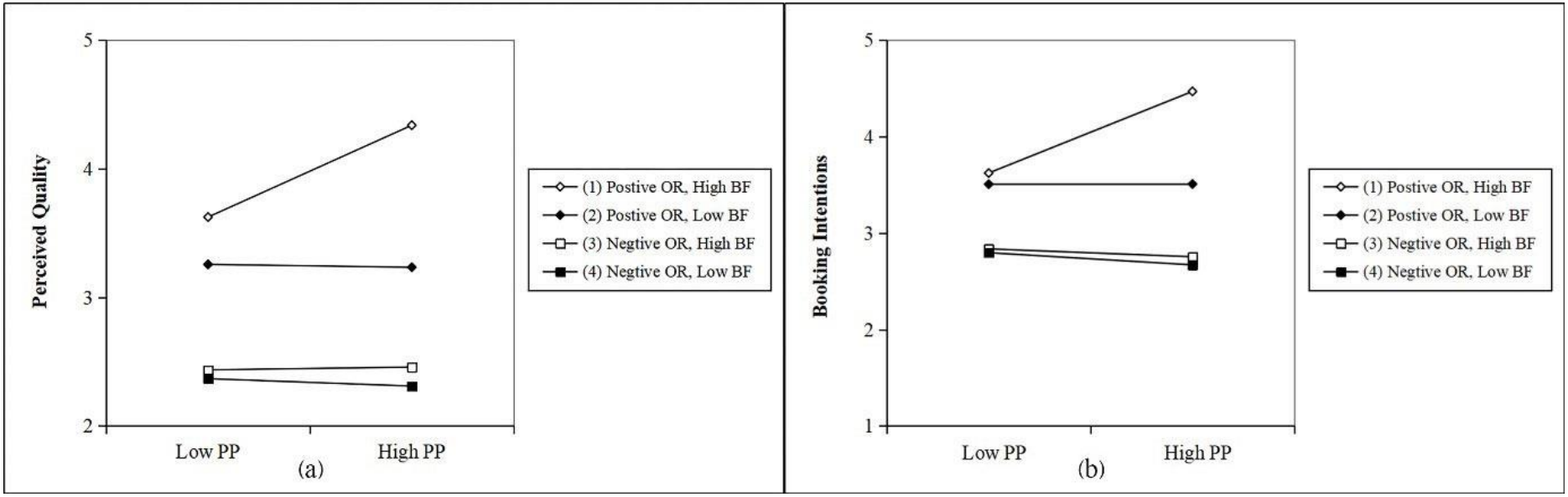

Figure 4. Simple effect analysis of the three-way interactions on perceived quality and booking intentions